

What is claimed is:

- 1 1. A preparation method for biochips, comprising:
 - 2 (a) providing a substrate;
 - 3 (b) applying a micro-injecting process to spray a hydrophobic material on the substrate for forming a hydrophobic region thereon, and a plurality of partitions being defined on the hydrophobic region; and
 - 4 (c) immobilizing a probe on each partition by the micro-injecting process.
- 1 2. The preparation method as claimed in claim 1, wherein the hydrophobic material is selected from a group consisting of Teflon, polyimide, fluoro-compound, and silicon compound.
- 1 3. The preparation method as claimed in claim 1, wherein the micro-injecting process is performed by a micro-injector to spray vertically, horizontally, unidirectionally or bidirectionally.
- 1 4. The preparation method as claimed in claim 3, wherein the micro-injector is selected from a group consisting of a thermal bubble micro-injector and a piezo micro-injector.
- 1 5. The preparation method as claimed in claim 1, wherein the substrate is a hydrophobic substrate and is selected from a group consisting of glass, silica, quartz, mica, ceramics, and metals.

1 6. The preparation method as claimed in claim 5,
2 further comprising a step (d), after the step (b), for
3 forming a hydrophilic functional group on each partition.

1 7. The preparation method as claimed in claim 6,
2 wherein the hydrophilic functional group is selected from a
3 group consisting of -NH₂, -COOH, -SH, epoxide, aldehyde, and
4 streptavidin.

1 8. The preparation method as claimed in claim 1,
2 wherein the substrate is a hydrophilic substrate selected
3 from a group consisting of polystyrene, polyester,
4 polycarbonate, polyvinylchloride, polyethylene,
5 polypropylene, polysulfone, polyurethane, and
6 polymethylmethacrylate (PMMA).

1 9. The preparation method as claimed in claim 8,
2 further comprising:

3 a step (e), after the step (a), hydrophobically
4 treating the substrate; and
5 a step (f), after the step (b), hydrophilically
6 treating each partition to form a hydrophilic
7 functional group thereto.

1 10. The preparation method as claimed in claim 9,
2 wherein the hydrophilic functional group is selected from a
3 group consisting of -NH₂, -COOH, -SH, epoxide, aldehyde, and
4 streptavidin.

1 11. The preparation method as claimed in claim 1,
2 wherein the partitions are selected from a group consisting
3 of square, circular, and geometric figures.

1 12. The preparation method as claimed in claim 1,
2 wherein the probe is selected from a group consisting of
3 DNA, RNA, nucleotides, oligonucleotides, protein,
4 antibodies, and peptides.

1 13. The preparation method as claimed in claim 1, wherein
2 the probe is immobilized to each partition by a binding
3 process.

1 14. The preparation method as claimed in claim 13,
2 wherein the binding process is selected from a group
3 consisting of adsorption, covalent binding, encapsulation,
4 cross-linking, and entrapment.

1 15. The preparation method as claimed in claim 1,
2 wherein the micro injecting process is performed by a
3 thermal micro-injector, and the micro-injector comprises:

4 a chamber for storing a fluid;
5 a micro injecting process pore disposed on the
6 chamber for ejecting the fluid;
7 a first heater and a second heater arranged on
8 two sides of the micro injecting process
9 pore respectively;

10 when the chamber is full of the fluid, the first heater
11 produces a first bubble and the second heater
12 produces a second bubble, and the two bubbles
13 spray out a drop of the fluid.

1 16. The preparation method as claimed in claim 15,
2 wherein the first and the second heaters are triggered by
3 one signal.

1 17. The preparation method as claimed in claim 15,
2 wherein the first bubble acts as a valve to limit an
3 ejection of the fluid in the chamber.

1 18. A biochip, comprising:
2 a substrate,
3 a plurality of hydrophobic regions formed on the
4 substrate by micro-injecting a hydrophobic
5 material on the substrate;
6 a plurality of hydrophilic partitions separated by the
7 hydrophobic regions disposed on the substrate;
8 and
9 a probe immobilized on each partition by a micro-
10 injecting process.

1 19. The biochip as claimed in claim 18, wherein the
2 substrate is a hydrophobic substrate selected from a group
3 consisting of glass, silicon, quartz, mica, ceramics, and
4 metals.

1 20. The biochip as claimed in claim 19, wherein the
2 surface of the hydrophobic substrate contains a hydrophilic
3 functional group after a hydrophilic treating.

1 21. The biochip as claimed in claim 20, wherein the
2 hydrophilic functional group is selected from a group

3 consisting of -NH₂, -COOH, -SH, epoxide, aldehyde, and
4 streptavidin.

1 22. The biochip as claimed in claim 21, wherein the
2 substrate is a hydrophilic substrate selected from a group
3 consisting of polystyrene, polyester, polycarbonate,
4 polyvinylchloride, polyethylene, polypropylene, polysulfone,
5 polyurethane, and polymethylmethacrylate (PMMA).

1 23. The biochip as claimed in claim 20, wherein the
2 substrate becomes hydrophobically because of a hydrophobic
3 treatment performed on the substrate before the plurality of
4 the partitions are formed.

1 24. The biochip as claimed in claim 23, wherein a
2 hydrophilic treatment is performed on the partitions to add
3 a hydrophilic functional group thereto after the partitions
4 are formed.

1 25. The biochip as claimed in claim 24, wherein the
2 hydrophilic functional group is selected from a group
3 consisting of -NH₂, -COOH, -SH, epoxide, aldehyde, and
4 streptavidin.

1 26. The biochip as claimed in claim 18, wherein the
2 hydrophobic material is selected from a group consisting of
3 Teflon, polyimide, compounds containing fluorides and
4 silicides.

1 27. The biochip as claimed in claim 18, wherein the
2 probe is selected from a group consisting of DNA, RNA,

3 nucleotides, oligonucleotides, protein, antibodies, and
4 peptides.

1 28. The biochip as claimed in claim 18, wherein the
2 probe is immobilized on the partition by a process selected
3 from a group consisting of adsorption, covalent binding,
4 encapsulation, cross-linking, and entrapment.